

Microfluidic Tank Assisted Nicotine Functionalization of Two Dimensional MoS₂

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Abstract

Recently, molybdenum disulfide (MoS₂) has allured deep research importance due to their exclusive optical, electrical and mechanical properties.¹ Incorporation of MoS₂ into logical applications it is obligatory to functionalize it with the chemical moieties. To avoid the effect of solvent and dopant on the electrode we set up a microfluidic tank over the MoS₂ channel. Here we report the tailoring of electrical properties of mechanically exfoliated MoS₂ by nicotine. Raman spectroscopy and electrical charge transport measurement revealed that nicotine imposes n-doping in MoS₂.² The threshold voltage forwarded left side from ~ 11 V to ~ 35 V, indicating n-type doping effect. Nicotine functionalization tailored the field effect mobility by a factor of ~ 6.4 without deteriorating the electrical properties of MoS₂ devices.³

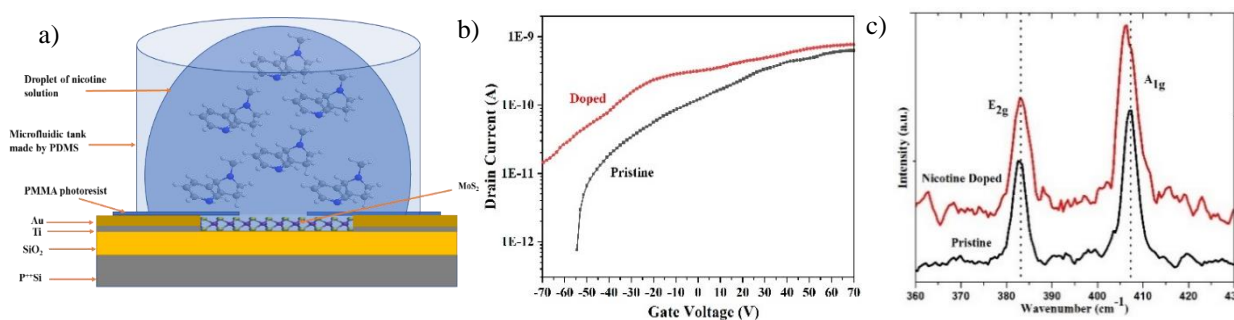


Figure 1. a) Schematic illustration of MoS₂-FET with the microfluidic tank where nicotine solution into the microfluidic tank is shown b) Transfer characteristics of the MoS₂-FET of pristine (black), doped (red) c) Raman spectra of MoS₂ of pristine (black) and doped (red).

References

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